WHAT IS CLAIMED IS:

1. A structure, comprising:

a shaft member, the shaft member being formed out of a first material, the shaft member having an outer periphery formed with at least one of an axial groove and a circumferential groove, the at least one groove having a cross section having opposed faces substantially parallel to each other;

a cylindrical member fitted to the outer periphery of the shaft member, the cylindrical member being formed out of a second material, the second material being greater in linear expansion coefficient than the first material; and

a caulked portion provided to the cylindrical member at a position corresponding to the at least one groove of the shaft member, the caulked portion having a deformed inner surface in press contact with the opposed faces of the at least one groove.

2. The structure as claimed in claim 1, wherein the axial groove and the circumferential groove are different in depth from each other, the caulked portion being placed at an intersection of the axial groove and the circumferential groove, wherein the deformed inner surface is in press contact with the opposed faces of the axial groove and the circumferential groove at the intersection.

3. The structure as claimed in claim 2, wherein the axial groove is greater in depth than the circumferential groove.

4. The structure as claimed in claim 2, wherein the caulked portion is greater in circumferential width than the intersection of the axial groove and the circumferential groove.

5. The structure as claimed in claim 4, wherein the caulked portion comprises a first caulked part corresponding to the circumferential groove and a second caulked part corresponding to the axial groove, the second caulked part being arranged substantially

in a middle of the first caulked part.

6. The structure as claimed in claim 1, wherein the axial groove comprises a plurality of groove portions in a circumferential direction.

7. The structure as claimed in claim 6, wherein the plurality of groove portions of the axial groove are three in number.

8. The structure as claimed in claim 1, wherein the cross section of the axial groove and the circumferential groove is rectangular.

9. The structure as claimed in claim 1, wherein the cylindrical member is loosely fitted to the shaft member except the caulked portion.

10. The structure as claimed in claim 1, wherein the axial groove has an opening edge formed at an acute angle.

11. The structure as claimed in claim 1, wherein the axial member comprises one of an input shaft and an output shaft arranged relatively rotatably with respect to the input shaft, the input shaft and the output shaft being used for a torque sensor of an electric power steering apparatus.

12. A method of coupling a shaft member and a cylindrical member, comprising:

forming the shaft member out of a first material;

forming in an outer periphery of the shaft member at least one of an axial groove and a circumferential groove, the at least one groove having a cross section having opposed faces substantially parallel to each other;

forming the cylindrical member out of a second material, the second material being greater in linear expansion coefficient than the first material;

fitting the cylindrical member to the outer periphery of the shaft member; and

caulking the cylindrical member at a position corresponding to the at least one groove of the shaft member, the caulking step providing a caulked portion having a deformed inner surface in press contact with the opposed faces of the at least one groove.

13. The method as claimed in claim 12, wherein the axial groove and the circumferential groove are different in depth from each other, the caulked portion being placed at an intersection of the axial groove and the circumferential groove, wherein the deformed inner surface is in press contact with the opposed faces of the axial groove and the circumferential groove at the intersection.

14. The method as claimed in claim 13, wherein the axial groove is greater in depth than the circumferential groove.

15. The method as claimed in claim 13, wherein the caulked portion is greater in circumferential width than the intersection of the axial groove and the circumferential groove.

16. The method as claimed in claim 15, wherein the caulked portion comprises a first caulked part corresponding to the circumferential groove and a second caulked part corresponding to the axial groove, the second caulked part being arranged substantially in a middle of the first caulked part.

17. The method as claimed in claim 12, wherein the caulking step is carried out with a caulker having a head of a flat section, wherein the caulking step is carried out by making the head of the caulker in press contact with the cylindrical member.

18. The method as claimed in claim 17, wherein the head of the caulker is of a

shape substantially corresponding to the circumferential groove.

19. The method as claimed in claim 12, wherein the caulking step is carried out at a temperature of about 20°C.

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20. The method as claimed in claim 12, further comprising:

positioning, prior to the caulking step, the cylindrical member with respect to the axial member in a loosely fitted state.